

爱德思
Mechanics 2
分类真题
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A Level Clouds 出品

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Chapter 1

Projectiles

6.

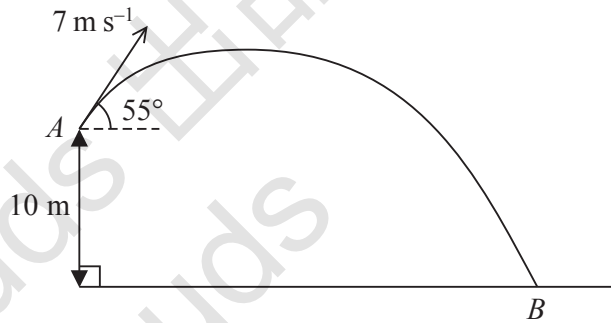


Figure 3

A small ball P is projected with speed 7 m s^{-1} from a point A 10 m above horizontal ground. The angle of projection is 55° above the horizontal. The ball moves freely under gravity and hits the ground at the point B , as shown in Figure 3.

Find

- (a) the speed of P as it hits the ground at B , (4)
- (b) the direction of motion of P as it hits the ground at B , (3)
- (c) the time taken for P to move from A to B . (5)

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- At time $t = 0$, a particle P is projected with velocity $(4\mathbf{i} + 9\mathbf{j}) \text{ m s}^{-1}$ from a fixed point O on horizontal ground. The particle moves freely under gravity. When P is at the point H on its path, P is at its greatest height above the ground.

- At the point A on its path, the position vector of P relative to O is $(k\mathbf{i} + k\mathbf{j})$ m, where k is a positive constant.

- (c) Find, in terms of k , the position vector of the other point on the path of P which is at the same vertical height above the ground as the point A . (3)

At time T seconds the particle is at the point B and is moving perpendicular to $(4\mathbf{i} + 9\mathbf{j})$

- (d) Find the value of T . (4)

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